

CLAIMS

1. A method of segmenting a composite image of pixels into a number of fields corresponding to layout elements of the image, the pixels having a value representing an intensity and/or color of a picture element, the method comprising:

finding field separators corresponding to areas of adjacent pixels of the image, having a predefined property indicative of a background of the image;

extending the field separators along at least one separation direction to an outer border of the image;

constructing a tessellation grid of lines corresponding to the extended field separators;

constructing a set of basic rectangles, a basic rectangle being an area enclosed by lines of the tessellation grid; and

constructing the fields by connecting basic rectangles that are adjacent and not separated by a field separator.

2. The method as claimed in claim 1, wherein the step of constructing the set of basic rectangles comprises:

constructing a matrix map representing the tessellation grid by a two-dimensional array of elements that each represent either a basic rectangle or a line segment of the tessellation grid, an element having a first predefined value for representing a line corresponding to a field separator or a different value for representing a basic rectangle or a line corresponding to an extended field separator.

3. The method as claimed in claim 2, wherein the step of constructing the fields comprises:

connecting elements in the matrix map that have said different value.

4. The method as claimed in claim 1, wherein nodes are defined at points where the field separators connect, and wherein the step of constructing the fields comprises:

constructing a node matrix corresponding to the tessellation grid and including elements referring to nodes in the tessellation grid.

5. The method as claimed in claim 4, wherein the step of constructing the fields comprises:

constructing a contour for each area of connected elements in the matrix map and finding the nodes defining the field by projecting the contour on the node matrix.

6. The method as claimed in claim 5, wherein said contour is constructed by dilating the area and subtracting the area of the dilated area.

7. The method as claimed in claim 1, wherein the segmenting comprises:

constructing a graph, the graph having edges corresponding to areas of adjacent pixels having a predefined property indicative of a background of the image and vertices where the edges connect, and associating field separators to the edges of the graph, and

forming said tessellation grid by extending the field separators to an outer border of the image.

8. The method as claimed in claim 7, wherein the constructing of the graph comprises:

cleaning the graph by removing vertices that are connected to less than two edges and/or removing any edges that connect to such vertices.

9. The method as claimed in claim 1, further comprising:

snapping the lines in the tessellation grid to two orthogonal separation directions.

10. A computer program product embodied on at least one computer-readable medium, for segmenting a composite image of pixels into a number of fields corresponding to layout elements of the image, the pixels having a value representing an intensity and/or color of a picture element, the computer program product comprising computer-executable instructions for:

finding field separators corresponding to areas of adjacent pixels of the image, having a predefined property indicative of a background of the image;

extending the field separators along at least one separation direction to an outer border of the image;

constructing a tessellation grid of lines corresponding to the extended field separators;

constructing a set of basic rectangles, a basic rectangle being an area enclosed by lines of the tessellation grid; and

constructing the fields by connecting basic rectangles that are adjacent and not separated by a field separator.

11. The computer program product as claimed in claim 10, wherein the computer-executable instructions for constructing the set of basic rectangles comprise computer-executable instructions for:

constructing a matrix map representing the tessellation grid by a two-dimensional array of elements that each represent either a basic rectangle or a line segment of the tessellation grid, an element having a first predefined value for representing a line corresponding to a field separator or a different value for representing a basic rectangle or a line corresponding to an extended field separator.

12. The computer program product as claimed in claim 10, wherein nodes are defined at points where the field separators connect, and wherein the computer-executable instructions for constructing the fields comprises computer-executable instructions for:

constructing a node matrix corresponding to the tessellation grid and including elements referring to nodes in the tessellation grid.

13. The computer program product as claimed in claim 12, wherein the computer-executable instructions for constructing the fields comprise computer-executable instructions for:

constructing a contour for each area of connected elements in the matrix map and finding the nodes defining the field by projecting the contour on the node matrix.

14. The computer program product as claimed in claim 10, further comprising computer-executable instructions for:

snapping the lines in the tessellation grid to two orthogonal separation directions.

15. A device for segmenting a composite image of pixels into a number of fields corresponding to layout elements of the image, the pixels having a value representing the intensity and/or color of a picture element, the device comprising:

an input unit for inputting an image; and

a processing unit for finding field separators corresponding to areas of adjacent pixels having a predefined property indicative of a background of the image, wherein the processing unit extends the field separators along at least one separation direction to an outer border of the image,

constructs a tessellation grid of lines corresponding to the extended field separators,

constructs a set of basic rectangles, a basic rectangle being an area enclosed by lines of the tessellation grid, and

constructs the fields by connecting basic rectangles that are adjacent and not separated by a field separator.

16. The device as claimed in claim 15, wherein the processing unit constructs a matrix map representing the tessellation grid by a two-dimensional array of elements that each represent either a basic rectangle or a line segment of the tessellation grid, an element having a first predefined value for representing a line corresponding to a field separator or a different value for representing a basic rectangle or a line corresponding to an extended field separator.

17. The device as claimed in claim 15, wherein the processing unit constructs a node matrix corresponding to the tessellation grid and including elements referring to nodes in the tessellation grid.

18. The device as claimed in claim 15, further comprising:
a display unit for displaying fields of the image after segmenting.

19. The device as claimed in claim 15, wherein the processing unit snaps the lines in the tessellation grid to two orthogonal separation directions.